

WHAT IS CLAIMED IS:

1. A method for estimating a channel condition of a forward link by a mobile station in a mobile communication system including the mobile station and a base station for transmitting and receiving data using a plurality of subcarriers having mutual orthogonality, the method comprising the steps of:
- 5 measuring carrier-to-interference ratio (C/I) values of the plurality of subcarriers using a signal received from the base station;
- determining a subcarrier from the plurality subcarriers for transmitting feedback information in a given coherence bandwidth;
- 10 generating the feedback information of the subcarrier;; and
- transmitting the generated feedback information to the base station for estimating the channel condition of the forward link.
2. The method of claim 1, wherein the step of generating the feedback information of the subcarrier comprises the steps of:
- 15 determining whether a current time slot is a reference C/I transmission time slot;
- and
- generating the feedback information according to a predetermined bit obtained by quantizing a C/I value measured at the current time slot, if the current time slot is the reference C/I transmission time slot.
- 20 3. The method of claim 2, further comprising the steps of:
- calculating a difference value between a previously stored value and the C/I value measured at the current time slot, if the current time slot is not the reference C/I transmission time slot; and
- 25 generating the feedback information according to a predetermined bit obtained by quantizing the calculated difference value.

4. The method of claim 3, further comprising the step of updating the previously stored value by adding the calculated difference value to the previously stored value.

5 5. The method of claim 1, wherein the feedback information includes an average C/I value in the coherence bandwidth.

6. The method of claim 1, wherein the given coherent bandwidth is a frequency bandwidth where a forward channel condition has a predetermined correlation.
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7. The method of claim 1, wherein transmitting the generated feedback information to the base station for estimating the channel condition of the forward link comprising the steps of:
converting the digital signal of the generated feedback information to a baseband
15 analog signal;
upconverting the baseband signal to an RF signal;
transmitting the RF signal including the feedback information to the base station.

8. A method for estimating a channel condition of a forward link by a
20 mobile station in a mobile communication system including the mobile station and a base station for transmitting and receiving data using a plurality of subcarriers having mutual orthogonality, the method comprising the steps of:
estimating carrier-to-interference ratio (C/I) values of the plurality of subcarriers using a signal received from the base station;
25 generating feedback information using the estimated C/I values according to whether a current time slot is a time slot at which C/I values of all subcarriers in a given coherence bandwidth are transmitted; and
transmitting the generated feedback information to the base station for estimating the channel condition of the forward link.

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9. The method of claim 8, wherein the step of generating the feedback information comprises the steps of:

determining whether a current subcarrier is a subcarrier for transmitting a reference C/I, if the current time slot is the time slot at which the C/I values of all the subcarriers in the given coherence bandwidth are transmitted; and

generating the feedback information according to a predetermined bit obtained by quantizing a C/I value of a subcarrier for transmitting the reference C/I, if the current subcarrier is the subcarrier for transmitting the reference C/I.

10. The method of claim 9, further comprising the steps of:

calculating a difference between a previously stored value and a C/I value of the subcarrier, if the current subcarrier is not the subcarrier transmitting the reference C/I; and

generating the feedback information according to a predetermined bit obtained by quantizing the calculated difference value.

11. The method of claim 10, further comprising the step of updating the previously stored value by adding the quantized difference value to the previously stored value.

12. The method of claim 8, wherein the step of generating the feedback information comprises the steps of:

calculating a difference value between a previously stored value and the C/I value measured at the current time slot, if the current time slot is not the time slot at which the C/I values of all the subcarriers in the given coherence bandwidth are transmitted; and

generating the feedback information according to a predetermined bit obtained by quantizing the calculated difference value.

13. The method of claim 12, further comprising the step of updating the previously stored value by adding the quantized difference value to the previously stored value.

5 14. The method of claim 8, wherein the given coherent bandwidth is a frequency bandwidth where a forward channel condition has a predetermined correlation.

15. The method of claim 8, wherein transmitting the generated feedback information to the base station for estimating the channel condition of the forward link comprising the steps of:

10 converting the digital signal of the generated feedback information to a baseband analog signal;

upconverting the baseband signal to an RF signal;

transmitting the RF signal including the feedback information to the base station.

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16. A method for estimating a channel condition of a forward link by a mobile station in a mobile communication system including the mobile station and a base station for transmitting and receiving data using a plurality of subcarriers having mutual orthogonality, the method comprising the steps of:

20 measuring carrier-to-interference ratio (C/I) values of the plurality of subcarriers using a signal received from the base station;

determining whether a current time slot of a subcarrier is a reference C/I transmission time slot;

25 generating the feedback information using a reference C/I value of the subcarrier, if the current time slot of the subcarrier is the reference C/I transmission time slot; and

transmitting the generated feedback information to the base station for estimating the channel condition of the forward link.

17. The method of claim 16, further comprising the steps of:

calculating a difference value between a previously stored value and the C/I value measured at the current time slot, if the current time slot of the subcarrier is not the reference C/I transmission time slot; and

generating the feedback information according to a predetermined bit obtained
5 by quantizing the calculated difference value.

18. The method of claim 17, further comprising the step of updating the previously stored value by adding the calculated difference value to the previously stored value.
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19. The method of claim 16, wherein transmitting the generated feedback information to the base station for estimating the channel condition of the forward link comprising the steps of:

converting the digital signal of the generated feedback information to a baseband
15 analog signal;

upconverting the baseband signal to an RF signal;
transmitting the RF signal including the feedback information to the base station.

20. A method for estimating a channel condition of a forward link by a base station in a mobile communication system including a mobile station and the base station for transmitting and receiving data using a plurality of subcarriers having mutual orthogonality, the method comprising the steps of:

receiving feedback information from the mobile station over a feedback channel;
analyzing carrier-to-interference ratio (C/I) values of subcarriers in a given
25 coherence bandwidth using the received feedback information; and
estimating the channel condition of the forward link using analyzed C/I values.

21. The method of claim 20, further comprising step of updating an accumulation value for estimating a channel condition of the forward link based on the analysis result.
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22. The method of claim 20, wherein the step of analyzing carrier-to-interference ratio (C/I) values of subcarriers in a given coherence bandwidth using the received feedback information comprises the steps of:

- analyzing a C/I value of a subcarrier receiving a reference C/I, if a current time slot is a time slot at which C/I values of all subcarriers in the coherence bandwidth are received, and if a current subcarrier is a subcarrier receiving the reference C/I; and
- storing the analyzed C/I value as an accumulation value for estimating the channel condition of the forward link.

23. The method of claim 22, further comprising the steps of:

- analyzing a C/I value of the received subcarrier as a frequency-domain relative value of the reference C/I, if the current subcarrier is not a subcarrier receiving the reference C/I; and
- updating the previously stored accumulation value by adding the frequency-domain relative value to the previously stored accumulation value.

24. The method of claim 20, wherein the step of analyzing carrier-to-interference ratio (C/I) values of subcarriers in a given coherence bandwidth using the received feedback information comprises the steps of:

- analyzing a C/I value of the received subcarrier as a time-domain relative value, if, under the preset condition, the current time slot is not a time slot at which C/I values of all subcarriers in the coherence bandwidth are received, and if a current subcarrier is a subcarrier receiving the reference C/I; and
- updating a previously stored accumulation value by adding the time-domain relative value to the previously stored accumulation value.

25. The method of claim 20, wherein the given coherent bandwidth is a frequency bandwidth where a forward channel condition has a predetermined correlation.

26. The method of claim 20, wherein the receiving feedback information from the mobile station over a feedback channel is comprising the steps of:

receiving an RF signal including the feedback information by an antenna;
downconverting the RF signal to a baseband signal; and
converting the baseband signal to a digital signal.

5 27. The method of claim 20, wherein the step of analyzing carrier-to-interference ratio (C/I) values of subcarriers in a given coherence bandwidth using the received feedback information is comprising the steps of:
analyzing a C/I value of a subcarrier receiving a reference C/I, if a current
subcarrier is a subcarrier receiving the reference C/I; and
10 storing the analyzed C/I value as an accumulation value for estimating the channel condition of the forward link.

28. A method for estimating a channel condition of a forward link by a base station in a mobile communication system including a mobile station and the base station
15 for transmitting and receiving data using a plurality of subcarriers having mutual orthogonality, the method comprising the steps of:
determining whether a current time slot of a subcarrier is a reference C/I transmission time slot;
receiving feedback information using a reference C/I value of the subcarrier, if
20 the current time slot of the subcarrier is the reference C/I transmission time slot; and
estimating the channel condition of the forward link using analyzed C/I values.

29. The method of claim 28, further comprising the step of:
receiving feedback information using a difference value between a previously
25 stored value and the C/I value measured at the current time slot, if the current time slot of the subcarrier is not the reference C/I transmission time slot.

30. The method of claim 29, further comprising the step of updating the previously stored value by adding the calculated difference value to the previously stored
30 value.

31. The method of claim 28, further comprising the steps of:
 receiving a RF signal including the feedback information by an antenna;
 downconverting the RF signal to a baseband signal; and
 converting the baseband signal to digital signal.

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32. An apparatus for estimating a channel condition of a forward link by a mobile station in a mobile communication system including the mobile station and a base station for transmitting and receiving data using a plurality of subcarriers having mutual orthogonality, comprising:

- 10 a forward link channel estimator for estimating carrier-to-interference ratio (C/I) values of the subcarriers using a received signal;
 a feedback information generator for and generating the feedback information of a subcarrier to be transmitted; and
 a feedback channel for transmitting the generated feedback information to the
 15 base station for estimating the channel condition of the forward link.

33. The apparatus of claim 32, wherein the feedback channel transmitter is comprising of:

- 20 a digital to analog converter for converting a digital signal of the generated feedback information to a baseband analog signal;
 an RF processor for upconverting the baseband signal to an RF signal;
 an antenna for transmitting the RF signal including the feedback information to the base station.

25 34. An apparatus of claim 32, wherein the feedback information generator comprises the steps of:

- determining whether a current time slot of the subcarrier in a given coherence bandwidth is a reference C/I transmission time slot; and
 generating the feedback information using a reference C/I value at the current
 30 time slot, if the current time slot of the subcarrier is the reference C/I transmission time slot.

35. The apparatus of claim 34, wherein the given coherent bandwidth is a frequency bandwidth where a forward channel condition has a predetermined correlation.

5 36. An apparatus of claim 34, wherein the feedback information generator further comprises the steps of:

calculating a difference value between a previously stored value and the C/I value measured at the current time slot, if the current time slot of the subcarrier is not the reference C/I transmission time slot; and

10 generating the feedback information according to the calculated difference value.

37. An apparatus of claim 32, wherein the feedback information generator comprises the steps of:

15 determining whether a current subcarrier is a subcarrier for transmitting a reference C/I, if the current time slot is the time slot at which the C/I values of all the subcarriers in the given coherence bandwidth are transmitted; and

generating the feedback information using a reference C/I value of a subcarrier for transmitting the reference C/I, if the current subcarrier is the subcarrier for transmitting the reference C/I.

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38. The apparatus of claim 37, wherein the given coherent bandwidth is a frequency bandwidth where a forward channel condition has a predetermined correlation.

25 39. An apparatus of claim 37, wherein the feedback information generator further comprises the steps of:

calculating a difference between a previously stored value and a C/I value of the subcarrier, if the current subcarrier is not the subcarrier transmitting the reference C/I; and

30 generating the feedback information using the calculated difference value.

40. An apparatus for estimating a channel condition of a forward link by a base station in a mobile communication system including a mobile station and the base station for transmitting and receiving data using a plurality of subcarriers having mutual orthogonality, comprising:

- 5 a feedback channel receiver for receiving feedback information using carrier to interference ratio(C/I) value from the mobile station over a feedback channel; and
 a feedback information analyzer for estimating C/I values of the subcarriers according to a preset condition and estimating the channel condition of the forward link.

10 41. An apparatus of claim 40, wherein the feedback information analyzer further comprising the step of:

 updating an accumulation value for estimating the channel condition of the forward link based on the analysis result.

15 42. An apparatus of claim 40, wherein the feedback information is a reference C/I value of a subcarrier generated in the reference C/I transmission time slot in a given coherence bandwidth.

20 43. An apparatus of claim 40, wherein the feedback information is difference C/I values of the subcarriers between a previously stored value and the C/I value measured at the current time slot in a given coherence bandwidth.

25 44. The method of claim 42, wherein the given coherent bandwidth is a frequency bandwidth where a forward channel condition has a predetermined correlation.

30 45. An apparatus of claim 40, wherein the feedback information includes a reference C/I value of one subcarrier generated in the reference C/I transmission time slot and difference C/I values of others subcarrier between a previously stored value and the C/I value measured at the current time slot in a given coherence bandwidth.

46. The apparatus of claim 45, wherein the given coherent bandwidth is a frequency bandwidth where a forward channel condition has a predetermined correlation.

47. The apparatus of claim 40, wherein a feedback channel receiver is
5 comprising:

an antenna for receiving a RF signal including the feedback information by an antenna;

a RF processor for downconverting the RF signal to a baseband signal; and
an analog to digital converter for converting the baseband signal to digital signal.